



1995-96 KIRIS OPEN-RESPONSE ITEM SCORING WORKSHEET

Grade 8 — Science Question 3

The academic expectations applied in this item include:

2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.

2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.

The core content assessed by this item includes:

Process

- Questions are identified that can be answered through scientific investigations.
- Current scientific knowledge and understanding guide scientific investigations.

Content

- Earth's Subsystems
 - * Land forms are the result of a combination of constructive and destructive forces. Patterns of earthquakes, volcanoes, and deposition (constructive forces) and weathering and erosion (destructive forces) are observable.

3. Earthquake Predictions

Scientists have made several observations about earthquakes. They include:

- The occurrence of previous major earthquakes indicates a higher likelihood of future earthquakes in the same area; and
- the longer it has been since the last earthquake in an area, the greater the possibility an earthquake will occur in that area.

In addition to these observations, other information would be helpful in predicting the likelihood of future earthquakes. Develop two or more questions that would help you collect this information. Explain your reasons for wanting to collect each piece of information.

SCORING GUIDE

Score	Description
4	A. Student develops two or more questions that help collect information for predicting future earthquakes. B. Student explains a valid reason for wanting each piece of information.
3	A. Student develops two or more questions that help collect information for predicting future earthquakes. B. Student explains a valid reason for wanting one piece of information.
2	A. Student develops two or more questions that help collect information for predicting future earthquakes. B. No valid reasons are given. OR A. Student develops one question that will help collect information for predicting future earthquakes. B. Student explains a valid reason for wanting one piece of information.
1	A. Student develops one question that will help collect information for predicting future earthquakes. B. No valid reasons are given.
0	Response is incorrect or irrelevant.
BLANK	Blank/no response.

Information/Reasons:

Fault Lines	Initial Tremors
Animal Behavior	
Seismograph	Frequency - Pattern
Volcanoes	Location - Fault Line
After Shocks	Strength



KIRIS ASSESSMENT ANNOTATED RESPONSE

GRADE 8 SCIENCE

Sample 4-Point Response of Student Work

If I were collecting information on earthquakes one of the first things I would want to know is how strong was the earthquake. Perhaps if it was a small earthquake then a stronger one is preparing, and maybe if it was a big one then a smaller one could be coming.

The second thing I would want to know is when did all of these earthquakes occur? Maybe if I looked over all of the dates I would be able to see a pattern and I would be able to predict when and where the next earthquake would occur. I would also ask how strong each earthquake was, make a graph, and also look for patterns there. I know this information would allow me to better predict the likelihood of future earthquakes.

Student develops two questions to collect information, i.e. the strength of the last earthquake and the dates of earthquakes in the past.

Student explains a valid reason for wanting each piece of information, i.e. to predict the strength of the next earthquake and to predict when the next earthquake might occur.

Student demonstrates an ability to identify questions that can be answered through scientific investigations.

Student demonstrates an application of scientific ways of thinking and working and uses those methods to solve real-life problems.

Student demonstrates an understanding that current scientific knowledge and understanding guide scientific investigations.

Student demonstrates an application of patterns such as cycles and trends to understand past and present events and predict possible future events.

Student demonstrates a knowledge that land forms are the result of a combination of constructive and destructive forces. Patterns of earthquakes, volcanoes, and deposition (constructive forces) and weathering and erosion (destructive forces) are observable.



KIRIS ASSESSMENT ANNOTATED RESPONSE

GRADE 8 SCIENCE

Sample 3-Point Response of Student Work

There is lots of information about earthquakes to be gather even today. If I wanted to find out more about earthquakes I would ask myself many questions including; Is this town near a crustal plate? If not, it probably won't have many earthquakes. How long has it been since any earthquake has been here? Was the barometer reading high or low? How many were effected? Where did it take place exactly? All of the answers to these questions would help someone to predict when, where, and how serious the next earthquake may be. I would also want to know the averge, or mean, number of earthquakes in this area per year, decade, and century. I would research the events and weather patterns previous to and following those earthquakes. If I suspected an upcoming earthquake, the most important thing to do would be to alert the public of safety precautions and hazards. I would want everyone to know about earthquakes and how to prepare for one.

Student develops many questions to collect information.

Student demonstrates an ability to identify questions that can be answered through scientific investigations.

Student demonstrates an understanding that current scientific knowledge and understanding guide scientific investigations.

Student demonstrates a knowledge that land forms are the result of a combination of constructive and destructive forces. Patterns of earthquakes, volcanoes, and deposition (constructive forces) and weathering and erosion (destructive forces) are observable.

Student explains only one reason for wanting the information provided by the questions, i.e. if the town is **not** near a crustal plate, then it probably won't have many earthquakes.

Student demonstrates an application of scientific ways of thinking and working and uses those methods to solve real-life problems.

Student demonstrates an application of patterns such as cycles and trends to understand past and present events and predict possible future events.



KIRIS ASSESSMENT ANNOTATED RESPONSE

GRADE 8 SCIENCE

Sample 2-Point Response of Student Work

There is a lot of information that would be helpful in predicting earthquakes. Here is one question that would be helpful. The intensity or strength of previous earthquakes indicates a higher likelihood of future earthquakes in the same area. I would want to know this information to determine how much damage was done. Also, this would tell us how much longer until the next earthquake and about how much damage it will do. Here is a second question that would be helpful. The number of times previous earthquakes have occurred in the same area indicate higher likelihood of future earthquakes in the same area. I would want to collect this information to see how often earthquakes have occurred in the same area. The frequency of earthquakes in the same area tells us how easy or hard it is for an earthquake to occur. In conclusion, collecting this information would be helpful in predicting the likelihood of future earthquakes.

Student develops one valid question to collect information, i.e. the strength of the previous earthquakes.

Student develops one invalid question that repeats information from the question, i.e. the number of times previous earthquakes have occurred.

Student demonstrates some ability to identify questions that can be answered through scientific investigations.

Student demonstrates some understanding that current scientific knowledge and understanding guide scientific investigations.

Student explains a reason for wanting the information provided by the one valid question, i.e. to predict the likelihood of future earthquakes, when an earthquake might occur, and about how much damage it would do.

Student demonstrates some application of scientific ways of thinking and working and uses those methods to solve real-life problems.

Student demonstrates some application of patterns such as cycles and trends to understand past and present events and predict possible future events.

Student demonstrates some knowledge that land forms are the result of a combination of constructive and destructive forces. Patterns of earthquakes, volcanoes, and deposition (constructive forces) and weathering and erosion (destructive forces) are observable.



KIRIS ASSESSMENT ANNOTATED RESPONSE

GRADE 8 SCIENCE

Sample 1-Point Response of Student Work

I have several questions:

- 1) Does a large earthquake decrease the likelihood of one larger than that? I would want to know this so I could be ready for a larger earthquake.
- 2) Do on land earthquakes cause tsunamis? I would want to know this if I lived near an ocean.
- 3) Does the number of after shocks have anything to do with when the next earthquake is going to be?
- 4) Are those Bugle Boy jeans you're wearing?
- 5) Did you steal those after an earthquake?

Student develops one question to collect information for predicting earthquakes.

Student does **not** explain any valid reasons for wanting the information.

INSTRUCTIONAL STRATEGIES

Earthquake Predictions

Students analyze the components of plate tectonics and describe why the earth's surface area remains constant even though the surface changes.

Students investigate and chart the frequency of occurrence of earthquakes in a specific geographic region.

Students predict the possible location of the earth's land masses one million years from now.

Students design and construct a physical model that shows crustal plate movements, mountain building, volcanoes, and earthquakes.

Students compare the proportions of parts of an apple (peel, apple, and core) to the earth's crust, mantle, and core.